

Mutagenic Evaluation of Compound FDA 73-42 (Ammonium Sulfite Granular, Food
Grade) 6/30/75

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LBI PROJECT #2468

MUTAGENIC EVALUATION OF

COMPOUND FDA 73-42

007783202

AMMONIUM SULFATE GRANULAR,
FOOD GRADE

SUBMITTED TO

FOOD & DRUG ADMINISTRATION
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
ROCKVILLE, MARYLAND

SUBMITTED BY

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JUNE 30, 1975



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EVALUATION SUMMARY

Compound FDA 73-42, Ammonium Sulfate Granular Food Grade, did not exhibit genetic activity in any of the in vitro microbial assays employed in this evaluation.



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DATE: June 30, 1975

SPONSOR: Food and Drug Administration, Contract Number 223-74-2104

SUBJECT: Evaluation of Test Compound 007783202 Ammonium Sulfate Granular
Food Grade FDA 73-42

I. OBJECTIVE

The objective of this study was to evaluate the test compound for genetic activity in microbial assays with and without the addition of mammalian metabolic activation preparations.

II. MATERIALS

A. Test Compound

1. Date Received: August, 1974
2. Description: White granular crystals

B. Indicator Microorganisms

The following strains of indicator microorganisms were used in the evaluation:

Yeast Strain: Saccharomyces cerevisiae, strain D4

Bacteria Strains: Salmonella typhimurium, strains: TA-1535
TA-1537
TA-1538

C. Reaction Mixture

The following reaction mixture was employed in the activation tests:

<u>Component</u>	<u>Final Concentration/ml</u>
1. TPN (sodium salt)	6 μ M
2. Isocitric acid	49 μ M
3. Tris buffer, pH 7.4	28 μ M
4. $MgCl_2$	1.7 μ M
5. Tissue homogenate fraction	72 mg



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D. Tissue Homogenates and Supernatants

The tissue homogenates and 9,000 x g supernatants were prepared from tissues of the following mammalian species: Mouse-ICR random bred adult males; rat-Sprague-Dawley adult males; and primate-Macaca mulatta adult males.

E. Positive Control Compounds

Table 1 lists chemicals for positive controls in the direct and activation assays.

TABLE 1
POSITIVE CONTROLS USED IN DIRECT AND ACTIVATION ASSAYS

<u>Assay</u>	<u>Chemical^a</u>	<u>Solvent</u>	<u>Probable Mutagenic Specificity</u>
Nonactivation	Ethyl methanesulfonate	Water or saline	BPS ^b
	2-Nitrofluorene	Dimethylsulfoxide ^c	FS ^b
	Quinacrine mustard	Water or saline	FS ^b
Activation	Dimethylnitrosamine	Water or saline	BPS ^b
	2-Acetylaminofluorene	Dimethylsulfoxide ^c	FS ^b

^a Concentrations given in the Results Section

^b BPS = base-pair substitution; FS = frameshift

^c Previously shown to be non-mutagenic

III. METHODS

A. Toxicity

The solubility, toxicity and doses for all chemicals were determined prior to screening.

Each chemical was tested for survival against the specific indicator strains over a range of doses to determine the 50% survival dose. Bacteria were tested in phosphate buffer, pH 7.4, for one hour at 37°C on a shaker. Yeasts were tested in phosphate buffer, pH 7.4, for four hours at 30°C on a shaker. The 50% survival curve and the 1/4 and 1/2 50% doses calculated.

If no toxicity was obtained for a chemical with a given strain, then a maximum dose of 5% (w/v) was used against the strain.

Unless otherwise specified, the doses calculated for the tests in buffer were applied to the activation tests. The solubility of the test chemical under treatment conditions is stated in the Results Section.



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B. Plate Tests

In the nonactivation procedure, approximately 10^9 cells of a log phase culture of the bacterial indicator strains were spread over the surface of a minimal plate, and a measured amount of the test chemical was placed in the center of the test plate. In activation tests, the test chemical was added to the cells, and an aliquot of the mixture was spread on the surface of the test plate. The reaction mixture (0.1 ml) plus tissue extract was then spotted on the surface of the plate. Positive and solvent controls were included. All plates were incubated at 37°C for four days and then scored. Each compound (Test, Positive Control and Solvent Control) was done in duplicate. Concentrations of the positive control compounds are listed in the Results Section.

C. Suspension Tests

1. Nonactivation

Log-phase bacteria and stationary-phase yeast cultures of the indicator organisms were grown in complete broth, washed and resuspended in 0.9% saline to densities of 1×10^9 cells/ml and 5×10^7 cells/ml, respectively. This constituted the working stock for tests of a group of test chemicals and their respective controls. Tests were conducted in plastic tissue culture plates. Cells plus appropriate volume(s) of the test chemical were added to the wells to give a final volume of 1.5 ml. The solvent replaced the test chemical in the negative controls. Treatment was at 30°C for four hours for yeast tests and at 37°C for one hour for bacterial tests. All flasks were shaken during treatment. Following treatment, the plates were set on ice. Aliquots of cells were removed, diluted in sterile saline (4°C) and plated on the appropriate complete media. Undiluted samples from flasks containing the bacteria were plated on minimal selective medium in reversion experiments. Samples from a 10^{-1} dilution of treated cells were plated on the selected media for enumeration of gene conversion with strain D4. Bacterial plates were scored after incubation for 48 hours at 37°C. The yeast plates were incubated at 30°C for 3-5 days before scoring.

2. Activation

Bacteria and yeast cells were grown and prepared as described in the nonactivation tests. Measured amounts of the test and control chemicals plus 0.25 ml of the stock-cell suspension were added to wells of the Linbro plate containing the appropriate tissue fraction and reaction mixture. All flasks (bacteria and yeast) were incubated at 37°C in an oxygen atmosphere with shaking. The treatment times as well as the dilutions, plating procedures and scoring of the plates were the same as described for nonactivation tests.



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D. Preparation of Tissue Homogenates and 9,000 x g Cell Fractions

Male animals (sufficient to provide the necessary quantities of tissues) were killed by cranial blow, decapitated and bled. Organs were immediately dissected from the animal using aseptic techniques and placed in ice-cold 0.25 M sucrose buffered with Tris at pH of 7.4. Upon collection of the desired quantity of organs, they were washed twice with fresh buffered sucrose and completely homogenized with a motor-driven homogenizing unit at 4°C. The whole organ homogenate obtained from this step was divided into two samples. One sample was frozen at -80°C and the other was centrifuged for 20 minutes at 9,000 x g in a refrigerated centrifuge. The supernatant from the centrifuged sample was retained and frozen at -80°C. These two frozen samples were used for the activation studies.

E. Data Recording and Reporting

Following the specified incubation periods all population plates were scored by an automatic colony counter and the results from each plate of a set were recorded, in ink, on data processing forms. All minimal or other types of selective media plates were hand scored and the results recorded along with the respective population data. Other relevant experimental data were recorded on experimental definition forms. For bacteria strains the number of colonies recorded from either the population or selective plates represents that number in 1 ml of test suspension plated. The numbers recorded for the yeast strain D4 represent the number in 0.5 ml of test suspension plated. The data were then processed and printed from a computer program.



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IV. RESULTS SECTION

A. Solubility Properties of the Test Compound

1. Name or code designation of the test compound: 007783202
Ammonium Sulfate, Granular Food Grade
2. Test solvent: Saline
3. Solubility of the test compound under treatment conditions:
Soluble under treatment conditions
4. Additional comments: White granular crystals

B. Toxicity and Dosage Determinations for the Test Compound

1. Test date for toxicity determination: April 11, 1975
2. The 50% survival level was determined for bacteria and yeast indicator organisms by conducting survival curves with the test compound at the following concentrations:

Percent Concentration (w/v or v/v)

10.0
1.0
0.1
0.01
0.001

3. Concentrations of the test compound used in the mutagenicity tests:

<u>Dose</u>	<u>Percent Concentration</u>	
	<u>Bacteria</u>	<u>Yeast</u>
1/4 50% Survival	2.5	2.5
1/2 50% Survival	5.0	5.0
50% Survival	10.0	10.0
Plate Tests	5.0	--



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V. SUMMARY OF TEST RESULTS

Plate Tests

A. Name or code designation of the test compound: 007783202

B. Test date: April 25, 1975

C. Concentration of the test compound: 5.0%

Test	Species	Tissue	REVERTANTS/PLATE					
			TA-1535		TA-1537		TA-1538	
			1	2	1	2	1	2
1. <u>Non-activation</u>								
Solvent Control	---	---	40	41	11	13	27	23
Positive Control ^a	---	---	>10 ³	>10 ³	183	113	98	129
Test Compound	---	---	17	27	10	13	20	23
2. <u>Activation</u>								
Negative Control	---	---	8	12	7	7	6	18
Solvent Control	---	---	13	4	15	16	23	21
Reaction Mixture Control	---	---	7	10	8	8	10	18
Positive Control ^b	Mouse	Liver	>10 ³	>10 ³	41	43	307	420
Positive Control		Lung	11	13	5	12	72	30
Positive Control		Testes	9	11	22	10	19	22
Positive Control	Rat	Liver	>10 ³	>10 ³	41	45	327	340
Positive Control		Lung	12	9	7	7	26	29
Positive Control		Testes	9	11	16	10	14	11
Positive Control	Monkey	Liver	390	329	44	41	363	310
Positive Control		Lung	11	9	7	10	21	24
Positive Control		Testes	9	12	16	6	17	12
Test Compound	Mouse	Liver	21	5	13	14	24	23
Test Compound		Lung	20	14	13	6	25	19
Test Compound		Testes	15	26	7	10	17	24
Test Compound	Rat	Liver	19	5	13	14	21	14
Test Compound		Lung	22	17	13	10	23	22
Test Compound		Testes	21	27	7	8	19	25
Test Compound	Monkey	Liver	22	5	17	18	28	22
Test Compound		Lung	18	13	14	11	27	21
Test Compound		Testes	16	27	5	8	18	20

a TA-1535 EMS 10 µl/plate
 TA-1537 QM 20 µg/plate
 TA-1538 NF 100 µg/plate

b TA-1535 DMNA 50 µM/plate
 TA-1537 AAF 100 µg/plate
 TA-1538 AAF 100 µg/plate



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DATA TABLE TERMS AND ABBREVIATIONS

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
COMPOUND	Client designated compound number appears in this column.
TEST CODES	<p> NAN = Nonactivation: Solvent Control NAP = Nonactivation: Positive Control NA1 = Nonactivation: Test Compound Dose 1 NA2, etc. = Reflects the other dose level(s) </p> <p> A+C = Negative Chemical Control A-C = Activation: Solvent Control ACP = Activation: Positive Control ACT = Activation: Test Compound A+T = Activation: Tissue Control </p> <p> LI = Liver Tissue Activation Fraction LU = Lung Tissue Activation Fraction KI = Kidney Tissue Activation Fraction TE = Testes Tissue Activation Fraction 1,2, etc. = Dose Levels </p>
CONCENTRATION	<p>All test compound dose levels are expressed as a whole number followed by an exponent (negative) identified by the appropriate units.</p> <p>Example: 0025-2PCT = 0.25 percent concentration</p>
POPU	Total number of viable cells in the plating sample raised to some exponent printed directly below the abbreviation (i.e., EP + 6 = $\times 10^6$).
MUT 1	Total number of mutants or convertants obtained from the sample plated raised to some exponent printed directly below the abbreviation (i.e., EP + 0 = 10^0). For strain D4, MUT 1 represents the number of ADE+ convertants.
MUT 2	Only used for strain D4 and represents the number of TRY+ convertants in the plated sample.
FREQ 1	The calculated mutation or gene conversion frequency times the negative exponent written directly below. For strain D4, FREQ 1 represents the ADE+ value.
FREQ 2	Only used for strain D4 and represents the TRY+ conversion frequency.
CONTAM	Presence of contamination on any plates.



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DATA TABLE TERMS AND ABBREVIATIONS (continued)

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
AAF	2-Acetylaminofluorene
DMSO	Dimethylsulfoxide
DMN	Dimethylnitrosamine
EMS	Ethyl Methanesulfonate
QM	Quinacrine Mustard
NF	Nitrofluorene
SPECIES	Animal Strains
SPRDAW	Sprague Dawley Rats
ICRFLO	Flow ICR Random Bred Mice
RHESUS	Rhesus Monkey (<u>Macaca mulatta</u>)
MIXEDB	Dog, Mixed Breed
NEWZEA	New Zealand White Rabbit

LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES / COMPOUND 007783202

TEST	ORG	TA1538 HIS EX-8	TA1535 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
NAN		7.58	17.74	1.81	15.00	1.07	0.93
NAP		376.09	2172.28		666.27	2.08	117.36
NA1		19.80	8.21	1.88	10.19	0.77	1.39
NA2		28.62	16.67	2.23	8.53	0.61	1.83



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES ICRFLO/MOUSE

COMPOUND 007783202

TEST	ORG	TA1535 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	4.61	18.11	10.20	2.12	1.52
ACT	A+T	9.87	14.08	14.37	3.14	5.10
ACT	A-C	4.84	7.98	10.54	2.91	0.83
ACT	PLI	1314.89	63.82	30.99	4.28	5.26
ACT	PLU	9.51	15.85	23.64	2.87	3.05
ACT	PTE	14.29	16.82	23.53	3.92	0.68
ACT	LI1	1.54	13.29	10.83	1.97	2.62
ACT	LI2	1.11	10.54	19.85	1.80	1.65
ACT	LU1	0.15	16.90	9.25	2.38	1.96
ACT	LU2	0.19	11.59	14.96	2.81	1.41
ACT	TE1	0.33	10.12	12.17	3.98	2.60
ACT	TE2	0.44	16.28	11.11	5.58	1.86



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES SPRDAW/RAT

COMPOUND 007783202

TEST	ORG	TA1535 HIS EX-8	TA1538 HIS EX-8	TA1537 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5
ACT	A+C	2.82	3.73	5.33	1.49	2.48
ACT	A+T	20.67	6.20	9.50	3.82	3.65
ACT	A-C	3.33	4.15	4.84	1.61	1.93
ACT	PLI	819.28	38.29	19.72	4.20	4.06
ACT	PLU	7.73	5.79	13.56	5.45	3.23
ACT	PTE	3.07	5.65	10.07	4.09	1.57
ACT	LI1	1.81	7.06	6.19	0.73	1.10
ACT	LI2	0.71	7.18	5.63	0.56	1.40
ACT	LU1	3.54	5.76	6.16	2.27	1.14
ACT	LU2	3.49	8.58	6.35	2.99	1.77
ACT	TE1	4.15	5.18	12.84	1.44	1.31
ACT	TE2	5.74	7.12	7.82	2.86	1.96



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES RHESUS/MONKEY

COMPOUND 007783202

TEST	ORG	TA1535 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	0000D4 ADE EX-5	0000D4 TRY EX-5
ACT	A+C	18.01	9.85	11.55	1.35	1.35
ACT	A+T	15.28	7.78	16.84	2.32	1.93
ACT	A-C	10.14	9.39	10.94	0.70	0.17
ACT	PLI	672.50	31.09	62.27	7.67	6.39
ACT	PLU	20.28	18.71	6.06	3.63	1.68
ACT	PTE	9.66	8.87	19.29	1.36	2.87
ACT	LI1	6.12	22.18	10.74	1.03	1.89
ACT	LI2	13.19	11.11	10.63	2.74	1.28
ACT	LU1	12.91	14.62	2.58	1.28	2.98
ACT	LU2	6.22	17.06	4.68	4.80	3.55
ACT	TE1	15.92	18.84	8.81	3.37	1.81
ACT	TE2	10.11	10.24	22.58	2.56	2.95



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VI. INTERPRETATION OF RESULTS AND CONCLUSIONS

Compound 007783202, Ammonium Sulfate Granular, Food Grade, was tested for genetic activity in a series of in vitro microbial assays with and without metabolic activation. The following results were obtained:

A. Salmonella typhimurium

1. Plate tests

At a concentration of 5.0%, 007783202, was not mutagenic for any of the bacterial indicator strains with or without activation.

2. Nonactivation suspension tests

The results of these tests were negative. The NA1 and NA2 doses with TA-1538 were repeated because of increased mutant frequencies. The repeat tests were negative.

3. Activation suspension tests

The results of these tests were negative.

B. Saccharomyces cerevisiae

1. Nonactivation suspension tests

The results of these tests were negative. The ade locus appeared not to respond to the positive control chemical. No reason for the lack of response was evident. The try locus appeared normal and the data was considered to be acceptable.

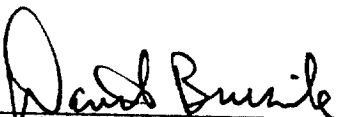
2. Activation suspension tests

The results of these tests were negative.

C. Conclusions

The test compound, Ammonium Sulfate Granular, Food Grade, did not exhibit genetic activity in the in vitro assays employed in this evaluation.

Submitted by:


David Brusick, Ph.D.
Director of Genetics



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APPENDIX
Tabulation of Data



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 512705 DETECTOR TA1535 SPECIES PROJECT 02468
/

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0248	0044	17.74	2
	NAP		EMS 0.002 %	0267	5800	2172.28	0
007783202	NA1		0005-0 PCT.	0195	0016	8.21	0
007783202	NA2		0025-1 PCT.	0204	0034	16.67	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 516304 DETECTOR TA1537 SPECIES PROJECT 02468
/

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
		NAN	SALINE	0140	0021	15.00	0
		NAP	QM 1.0 UG/ML	0169	1126	666.27	0
007783202	NA1		0005-0 PCT.	0108	0011	10.19	0
007783202	NA2		0025-1 PCT.	0129	0011	8.53	1



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 512205 DETECTOR TA1538 SPECIES PROJECT 02468
/

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		DMSO	0528	0040	7.58	0
	NAP		NF 125 UG-ML	0368	1384	376.09	0
007783202	NA1		0005-0 PCT.	0197	0039	19.80	2
007783202	NA2		0025-1 PCT.	0276	0079	28.62	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 517503 DETECTOR TA1538 SPECIES PROJECT 02468
/

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
		NAN	DMSO	0553	0010	1.81	0
007783202	NA1		0005-0 PCT.	0213	0004	1.88	0
007783202	NA2		0025-1 PCT.	0269	0006	2.23	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104
EXPERIMENT 513404 DETECTOR 0000D4 SPECIES / PROJECT 02468
DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	NAN		SALINE	0750	0008	0007	1.07	0.93	2
	NAP		EMS 1.0 %	0288	0006	0338	2.08	117.36	0
007783202	NA1		0005-0 PCT.	0648	0005	0009	0.77	1.39	1
007783202	NA2		0025-1 PCT.	0492	0003	0009	0.61	1.83	1



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 513504 DETECTOR TA1535 SPECIES ICRFLO/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP11 EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0456	0021	4.61	0
	A+T		***NO MATCH***	0233	0023	9.87	2
	A-C		SALINE	0558	0027	4.84	1
	ACP	LI	DMN 50 UM/ML	0188	2472	1314.89	2
	ACP	LU	DMN 50 UM/ML	0263	0025	9.51	2
	ACP	TE	DMN 50 UM/ML	0287	0041	14.29	2
007783202	ACT	LI1	0005-0 PCT.	0519	0008	1.54	2
007783202	ACT	LI2	0025-1 PCT.	0452	0005	1.11	2
007783202	ACT	LU1	0005-0 PCT.	0674	0001	0.15	2
007783202	ACT	LU2	0025-1 PCT.	0519	0001	0.19	2
007783202	ACT	TE1	0005-0 PCT.	0615	0002	0.33	2
007783202	ACT	TE2	0025-1 PCT.	0686	0003	0.44	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515406 DETECTOR TA1537 SPECIES ICRFLO/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0294	0030	10.20	0
	A+T		***NO MATCH***	0167	0024	14.37	3
	A-C		DMSO	0313	0033	10.54	0
	ACP	LI	AAF 800 UG/ML	0071	0022	30.99	2
	ACP	LU	AAF 800 UG/ML	0055	0013	23.64	0
	ACP	TE	AAF 800 UG/ML	0102	0024	23.53	0
007783202	ACT	LI1	0005-0 PCT.	0351	0038	10.83	2
007783202	ACT	LI2	0025-1 PCT.	0262	0052	19.85	2
007783202	ACT	LU1	0005-0 PCT.	0411	0038	9.25	0
007783202	ACT	LU2	0025-1 PCT.	0234	0035	14.96	0
007783202	ACT	TE1	0005-0 PCT.	0452	0055	12.17	2
007783202	ACT	TE2	0025-1 PCT.	0369	0041	11.11	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 512802 DETECTOR TA1538 SPECIES ICRFLO/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0762	0138	18.11	0
	A+T		***NO MATCH***	0206	0029	14.08	2
	A-C		DMSO	0489	0039	7.98	0
	ACP	LI	AAF 800 UG/ML	0304	0194	63.82	2
	ACP	LU	AAF 800 UG/ML	0429	0068	15.85	0
	ACP	TE	AAF 800 UG/ML	0446	0075	16.82	0
007783202	ACT	LI1	0005-0 PCT.	0316	0042	13.29	2
007783202	ACT	LI2	0025-1 PCT.	0370	0039	10.54	2
007783202	ACT	LU1	0005-0 PCT.	0284	0048	16.90	0
007783202	ACT	LU2	0025-1 PCT.	0276	0032	11.59	0
007783202	ACT	TE1	0005-0 PCT.	0326	0033	10.12	0
007783202	ACT	TE2	0025-1 PCT.	0258	0042	16.28	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515505 DETECTOR 0000D4 SPECIES ICRFLO/MOUSE DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0660	0014	0010	2.12	1.52	0
	A+T		***NO MATCH***	0765	0024	0039	3.14	5.10	2
	A-C		SALINE	0722	0021	0006	2.91	0.83	0
	ACP	LI	DMN 90 UM/ML	0608	0026	0032	4.28	5.26	0
	ACP	LU	DMN 90 UM/ML	0557	0016	0017	2.87	3.05	4
	ACP	TE	DMN 90 UM/ML	0739	0029	0005	3.92	0.68	4
007783202	ACT	LI1	0005-0 PCT.	0610	0012	0016	1.97	2.62	4
007783202	ACT	LI2	0025-1 PCT.	0668	0012	0011	1.80	1.65	2
007783202	ACT	LU1	0005-0 PCT.	0714	0017	0014	2.38	1.96	0
007783202	ACT	LU2	0025-1 PCT.	0854	0024	0012	2.81	1.41	0
007783202	ACT	TE1	0005-0 PCT.	0653	0026	0017	3.98	2.60	0
007783202	ACT	TE2	0025-1 PCT.	0699	0039	0013	5.58	1.86	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 513302 DETECTOR TA1535 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0815	0023	2.82	0
	A+T		***NO MATCH***	0150	0031	20.67	2
	A-C		SALINE	0991	0033	3.33	0
	ACP	LI	DMN 50 UM/ML	0166	1360	819.28	0
	ACP	LU	DMN 50 UM/ML	0220	0017	7.73	2
	ACP	TE	DMN 50 UM/ML	0163	0005	3.07	2
007783202	ACT	LI1	0005-0 PCT.	0498	0009	1.81	2
007783202	ACT	LI2	0025-1 PCT.	0420	0003	0.71	2
007783202	ACT	LU1	0005-0 PCT.	0594	0021	3.54	0
007783202	ACT	LU2	0025-1 PCT.	0716	0025	3.49	2
007783202	ACT	TE1	0005-0 PCT.	0579	0024	4.15	0
007783202	ACT	TE2	0025-1 PCT.	0418	0024	5.74	3



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 517102 DETECTOR TA1537 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	1425	0076	5.33	0
	A+T		***NO MATCH***	0600	0057	9.50	0
	A-C		DMSO	0785	0038	4.84	0
	ACP	LI	AAF 800 UG/ML	0999	0197	19.72	0
	ACP	LU	AAF 800 UG/ML	0804	0109	13.56	0
	ACP	TE	AAF 800 UG/ML	1073	0108	10.07	0
007783202	ACT	LI1	0005-0 PCT.	1163	0072	6.19	1
007783202	ACT	LI2	0025-1 PCT.	1457	0082	5.63	0
007783202	ACT	LU1	0005-0 PCT.	0974	0060	6.16	2
007783202	ACT	LU2	0025-1 PCT.	0803	0051	6.35	2
007783202	ACT	TE1	0005-0 PCT.	0522	0067	12.84	2
007783202	ACT	TE2	0025-1 PCT.	0767	0060	7.82	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 514702 DETECTOR TA1538 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0993	0037	3.73	0
	A+T		***NO MATCH***	0468	0029	6.20	0
	A-C		DMSO	1036	0043	4.15	0
	ACP	LI	AAF 800 UG/ML	0820	0314	38.29	0
	ACP	LU	AAF 800 UG/ML	1071	0062	5.79	0
	ACP	TE	AAF 800 UG/ML	0814	0046	5.65	0
007783202	ACT	LI1	0005-0 PCT.	0694	0049	7.06	2
007783202	ACT	LI2	0025-1 PCT.	0682	0049	7.18	2
007783202	ACT	LU1	0005-0 PCT.	0712	0041	5.76	2
007783202	ACT	LU2	0025-1 PCT.	0711	0061	8.58	2
007783202	ACT	TE1	0005-0 PCT.	0869	0045	5.18	2
007783202	ACT	TE2	0025-1 PCT.	0829	0059	7.12	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 513202 DETECTOR 0000D4 SPECIES SPRDAW/RAT DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0606	0009	0015	1.49	2.48	0
	A+T		***NO MATCH***	0576	0022	0021	3.82	3.65	6
	A-C		SALINE	0622	0010	0012	1.61	1.93	1
	ACP	LI	DMN 90 UM/ML	0690	0029	0028	4.20	4.06	4
	ACP	LU	DMN 90 UM/ML	0495	0027	0016	5.45	3.23	0
	ACP	TE	DMN 90 UM/ML	0635	0026	0010	4.09	1.57	6
007783202	ACT	LI1	0005-0 PCT.	0545	0004	0006	0.73	1.10	6
007783202	ACT	LI2	0025-1 PCT.	0714	0004	0010	0.56	1.40	6
007783202	ACT	LU1	0005-0 PCT.	0880	0020	0010	2.27	1.14	4
007783202	ACT	LU2	0025-1 PCT.	0736	0022	0013	2.99	1.77	0
007783202	ACT	TE1	0005-0 PCT.	0763	0011	0010	1.44	1.31	0
007783202	ACT	TE2	0025-1 PCT.	0664	0019	0013	2.86	1.96	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 512707 DETECTOR TA1535 SPECIES RHESUS/MONKEY

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0311	0056	18.01	0
	A+T		***NO MATCH***	0144	0022	15.28	0
	A-C		SALINE	0414	0042	10.14	0
	ACP	LI	DMN 50 UM/ML	0360	2421	672.50	2
	ACP	LU	DMN 50 UM/ML	0143	0029	20.28	0
	ACP	TE	DMN 50 UM/ML	0321	0031	9.66	2
007783202	ACT	LI1	0005-0 PCT.	0392	0024	6.12	0
007783202	ACT	LI2	0025-1 PCT.	0379	0050	13.19	0
007783202	ACT	LU1	0005-0 PCT.	0364	0047	12.91	0
007783202	ACT	LU2	0025-1 PCT.	0418	0026	6.22	2
007783202	ACT	TE1	0005-0 PCT.	0333	0053	15.92	0
007783202	ACT	TE2	0025-1 PCT.	0356	0036	10.11	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 515303 DETECTOR TA1537 SPECIES RHESUS/MONKEY

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0721	0071	9.85	0
	A+T		***NO MATCH***	0180	0014	7.78	1
	A-C		DMSO	0767	0072	9.39	0
	ACP	LI	AAF 800 UG/ML	0119	0037	31.09	0
	ACP	LU	AAF 800 UG/ML	0278	0052	18.71	0
	ACP	TE	AAF 800 UG/ML	0293	0026	8.87	0
007783202	ACT	LI1	0005-0 PCT.	0257	0057	22.18	0
007783202	ACT	LI2	0025-1 PCT.	0333	0037	11.11	0
007783202	ACT	LU1	0005-0 PCT.	0301	0044	14.62	0
007783202	ACT	LU2	0025-1 PCT.	0293	0050	17.06	0
007783202	ACT	TE1	0005-0 PCT.	0207	0039	18.84	0
007783202	ACT	TE2	0025-1 PCT.	0508	0052	10.24	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 514802 DETECTOR TA1538 SPECIES RHESUS/MONKEY

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0779	0090	11.55	0
	A+T		***NO MATCH***	0380	0064	16.84	1
	A-C		DMSO	0594	0065	10.94	0
	ACP	LI	AAF 800 UG/ML	0546	0340	62.27	0
	ACP	LU	AAF 800 UG/ML	1106	0067	6.06	0
	ACP	TE	AAF 800 UG/ML	0648	0125	19.29	0
007783202	ACT	LI1	0005-0 PCT.	0363	0039	10.74	0
007783202	ACT	LI2	0025-1 PCT.	0442	0047	10.63	0
007783202	ACT	LU1	0005-0 PCT.	0542	0014	2.58	2
007783202	ACT	LU2	0025-1 PCT.	0641	0030	4.68	0
007783202	ACT	TE1	0005-0 PCT.	0329	0029	8.81	0
007783202	ACT	TE2	0025-1 PCT.	0434	0098	22.58	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468				DATE - 07/08/75	
EXPERIMENT 514904		DETECTOR 0000D4		SPECIES RHESUS/MONKEY					
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0594	0008	0008	1.35	1.35	1
	A+T		***NO MATCH***	0518	0012	0010	2.32	1.93	0
	A-C		SALINE	0574	0004	0001	0.70	0.17	0
	ACP	LI	DMN 90 UM/ML	0626	0048	0040	7.67	6.39	0
	ACP	LU	DMN 90 UM/ML	0716	0026	0012	3.63	1.68	0
	ACP	TE	DMN 90 UM/ML	0661	0009	0019	1.36	2.87	0
007783202	ACT	LI1	0005-0 PCT.	0581	0006	0011	1.03	1.89	0
007783202	ACT	LI2	0025-1 PCT.	0547	0015	0007	2.74	1.28	4
007783202	ACT	LU1	0005-0 PCT.	0704	0009	0021	1.28	2.98	0
007783202	ACT	LU2	0025-1 PCT.	0563	0027	0020	4.80	3.55	0
007783202	ACT	TE1	0005-0 PCT.	0772	0026	0014	3.37	1.81	0
007783202	ACT	TE2	0025-1 PCT.	0508	0013	0015	2.56	2.95	1